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DIAGNOSES OF AMERICAN PORIAS—I*

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(WITH PLATE 1 AND FIGURES 1–6 IN THE TEXT)

PORIA AMBIGUA Bres., Atti Accad. Rovereto III 3: 84. 1897

Original Description: Latissime effusa, margine superiore reflexo, alba, demum stramineo-isabellina, subiculo membranaceo, arcte adnata, albo, tubuli ut plurimum obliqui, hic inde nodulosocongesti, usque ad 8 mm. longi; pori majusculi, angulati, demum dentato-laceri; sporae hyalinae, obovatae, 5–8 x 3.5 μ; basidia clavata, 18–20 x 6–8 μ; cystidia fusoidea, apice muricelata et demum laeva, 24–30 x 6–8 μ; hyphae subhymeniales tenuiter tunicatae, septatae, 3–4 μ latae.

Ad truncos *Fagi, Carpini, . . . Piri communis . . . Robiniae pseudacaciae.*

Nutat inter *Poria* et *Irpices.*

Redescription: Annual, effused in orbicular or elongated patches 3–10 cm. long and 2–5 cm. broad, inseparable, where best developed with a regular, white, sterile, shortly pubescent margin 2–2.5 mm. broad; subiculum thin, white, inconspicuous; tubes unstratified, 0.5–6 (usually 2–4) mm. long, pure white to dirty white when fresh, often cinnamon-buff to cinnamon in dried plants, angular, very thin-walled, often with the shape of an inverted cone, the dissepiments finely ciliate-dentate, averaging 1–3 per mm.; spores ellipsoidal or oblong-ellipsoidal, smooth, hyaline, 4–6 x 2.5–3.5 μ; cystidia absent or very inconspicuous; tramal tissue compact, of long and flexuous, simple or somewhat branched hyphae, with occasional or rare cross walls, no clamps, diameter 3–4.5 μ; subiculum hyphae more branched, with more numerous cross walls, no clamps, diameter up to 6 μ.

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On bark or wood of *Alnus, Amelanchier, Fagus, Gleditsia, Quercus,* and probably other deciduous trees; rarely on the ground or at the base of stumps, and then often encircling grass, weed stems, etc., in its growth.

Specimens Examined: Syracuse, N. Y.; Dayton and Oxford, Ohio (two collections); New Richmond and Ann Arbor, Mich.; St. Croix River, Minn.; St. Louis, Mo.; Fayetteville, Ark.

The writer's acquaintance with this species dates back to 1910, when it was collected at Oxford, Ohio, by Miss Audrey Richards and turned over to him for examination. Another collection was made in 1911, and in 1912 it was found growing on the ground

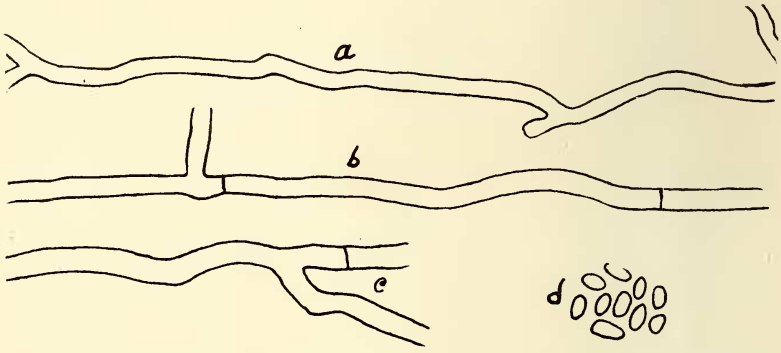


FIG. 1. *P. ambigua.* *a,* Hypha from the trama; *b,* Hypha from the subiculum; *c,* Larger type of hypha usually present; *d,* Spores.

in the garden of Professor Bruce Fink at Oxford. This latter collection was sent to Bresadola, who referred it to *P. ambigua,* described by him from Europe in 1897.

When fresh and growing, the color is white or dirty white, and the consistency of the fungus is soft but not watery. Older specimens, especially on drying, are apt to become darker, approaching cinnamon in color, but the affinities of the species are with the white Porias.

The tubes vary considerably in size, and there are always a considerable number that are inversely conical or funnel-shaped, perhaps due to the coalescence of two or more of them, as these are always larger than those that retain their cylindrical shape. The

peculiar shape of these tubes with their finely ciliate-dentate walls is a distinct aid in recognizing the plants in the field.

Internally the structure of the plant recalls that of *Polyporus pargamenus* Fr., although striking microscopic differences are not

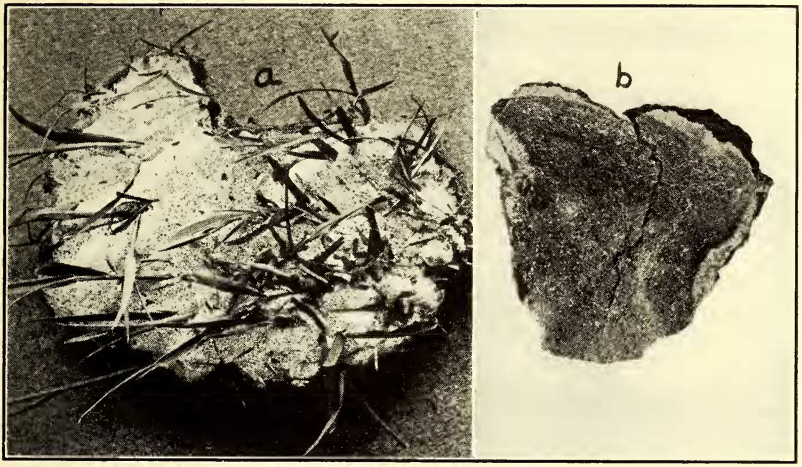


FIG. 2. *P. ambigua*. *a*, Specimen collected and photographed by Dr. A. H. W. Povah, Syracuse, N. Y., showing how the plant may grow around grasses, twigs, etc. (Overholts Herb. No. 5351.) *b*, Resupinate specimen on bark of *Fagus*. (Overholts Herb. No. 247.) × 1.

lacking. Plants in all stages of maturity show an abundance of oblong-ellipsoidal spores that measure 4–6 x 2.5–3.5 μ (Fig. 1, *d*). Their abundance suggests the possibility of their being conidial, but in sections of the hymenium it is not difficult to trace their connection to normal four-sterigmate basidia. Even a crushed preparation of the hymenium yields an abundance of spores. There are usually no cystidia to be seen, but prolonged search will sometimes yield inconspicuous conical or crystalline-capitate bodies, scarcely projecting beyond the basidia (Pl. I, fig. 6, *a*), and at first sight not readily distinguished from the latter. They are about 6 μ in diameter. The hyphae form a distinctive character of the species (Fig. 1, *a–c*). They are long and flexuous, with cross walls but no clamp connections, and are considerably branched. Those of the subiculum are more branched than those in the trama, have more frequent cross walls, and reach larger

diameters. In the trama it is not uncommon to find them without cross walls and only infrequently branched. The diameter of those of the trama varies from 3–4.5 μ, while in the subiculum they are mostly 4–6 μ.

Resupinate specimens of *Polyporus tulipiferus* and *P. pargamenus* have considerable resemblance to these plants. This is especially true of the former species in which the spores, especially before reaching mature size, are quite similar to those of this species. But in *P. tulipiferus* they are never obtainable in abundance in crushed mounts of the hymenium as they are in *P. ambigua*. Moreover, that species has conspicuous incrusted cystidia not difficult to find, and the diameter of the subiculum hyphae is not as great as in *P. ambigua*. Neither are the peculiar inversely conical tubes found in the former plant. From *P. pargamenus* the spores serve as the best distinguishing character, for in that species they are allantoid, 3–4 x 1 μ. The hyphae there are long and straight in both trama and subiculum, with few or no cross walls, unbranched, and the hymenium soon becomes decidedly irpiciform. These conditions are quite at variance with those found in *P. ambigua*.

The distinctive characteristics of the plant may be said to be the soft white growth, the inverted conical shape of some of the tubes, the abundant spores, lack of conspicuous cystidia, and the branched hyphae with cross walls but no clamps.

American collections of this species have been compared with authentic material kindly furnished by Rev. Bresadola, the author of the species, and they agree in all essential respects. The spore measurements given by the author are slightly larger than I find in both American and European material, but the difference is negligible. Rev. Bresadola also states that cystidia are present in the European plant, and on examining his material I find the same condition of affairs as described above for American material. In fact, the agreement of American and European material is in all particulars much closer than is ordinarily the case between species so widely separated.

PORIA FERRUGINOSA (Schrad.) Fr., Syst. Myc. 1: 378. 1821

Description, Fries, l. c.: Effusus, crassus, ferrugineo-spadiceus, poris subrotundis inaequalibus.

Inaequalis, saepe interruptus, durus, ½–1 unc. crassus, omnino excarnis. Pori mediae magnitudinis, subobliqui, acute.

Ad truncos Alneos. Aest.

Redescription: Effused for several centimeters on decorticated wood or rarely on bark; annual or at times perennial, 0.5–5 mm. thick, mostly inseparable, when young and growing with a brown tawny pubescent margin less than 1 mm. broad, when mature losing this and becoming entirely fertile; subiculum very thin, usually not more than 0.5 mm. thick, fibrous, scarcely discernible in thin fructifications; tubes frequently oblique, in one or rarely as many as four layers, 1–2 mm. long each season, not distinctly stratified in perennial specimens, brown within or the older layers somewhat whitish pubescent under a lens; the mouths cinnamon, sayal brown, or snuff brown, usually entirely without sheen though in some specimens a slight silkiness may be detected, unchanging on drying and the colors constant in herbarium specimens, subcircular to subangular, the dissepiments at most of only medium thickness and becoming thinner at maturity, even and entire except where growing in oblique situations, averaging 4–6 per mm.; spores oblong-ellipsoidal or oblong, hyaline, 4.5–5 x 2–3 μ; setae more or less abundant, rather short and sharp pointed, typically projecting 15–30 μ beyond the basidia, 5–7 μ diameter; hyphae straight and rigid, brown, no cross walls except rarely in the young hyphae, no clamps, simple, 2–3 μ diameter.

On dead wood of *Acer, Alnus, Fagus, Prunus, Populus, Salix, Ulmus, Quercus, Betula, Ostrya,* and perhaps other deciduous trees.

Specimens Examined: North Conway and Crawford Notch, N. H.; Cold Spring Harbor, Cranberry Lake, Vaughns, Karner, Crown Point, and Mechanicsville, N. Y.; Greenwood Furnace, Pa.; Oxford and Cincinnati, Ohio; Ann Arbor and New Richmond, Mich.; Edgemont, Ill.; Evaro, Mont.; Bellingham, Wash.; Ontario, Canada.

Apparently the species may be expected on all kinds of deciduous woods, but none have yet been seen on a coniferous substratum. It appears to be a species more abundant in the north and no specimens have been examined from south of Ohio. Ordinarily

the plant does not separate readily from the substratum and old specimens are entirely inseparable. But collections have been noted in which the young growing specimens on a smooth surface peel off in strips.

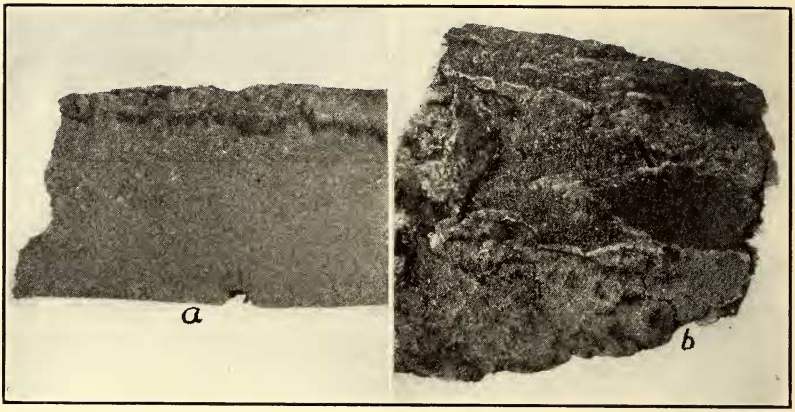


FIG. 3. *P. ferruginosa.* *a*, Specimen from Washington, on *Acer* (3879); *b*, Specimen from New Hampshire, on *Fagus* (5096). × 1.

When growing on an uneven surface or in a very oblique position the hymenium may be quite uneven and nodulose or thrown into distinct undulations. An extreme case of this unevenness is seen in specimens collected in Canada by Macoun and made the basis of a new species, *P. macouni*, by Peck. In these the plants were growing over old mosses. Otherwise they are typical *P. ferruginosa.*

Usually the species is annual or at least most of the collections examined are of the annual type. The greatest departure from this condition that has come under observation is in specimens on *Acer* from Washington, collected by Weir. In these, four layers of tubes are present. When cut with a sharp knife and examined under a lens these layers of tubes are fairly distinct, but to the naked eye they are not sharply separated. The hymenial surface of old weathered specimens occasionally fades out to gray.

The affinities of the species are with *P. viticola* Schw., for which a better name is probably *P.* (*Trametes*) *tenuis* Karst. From this species it is distinct in the spores, which there are cylindric

and measure 6–7 x 2 μ, consequently longer and more slender in proportion than in *P. ferruginosa.* In most cases there is an additional difference in the setae, which here project only 15–20 μ (Pl. I, figs. 3–4), or at most not more than 27 μ, beyond the basidia, while in *P. viticola* they are usually much longer, sometimes projecting as much as 60 μ beyond the basidia. However, a few collections of *P. viticola* have been noted in which this distinction does not hold, but in which the setae are quite like those of *P. ferruginosa.* In such cases the importance of the spores as a distinguishing character is much enhanced. Of course, some collections

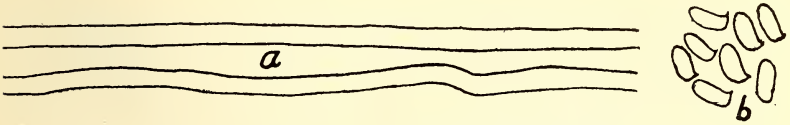


FIG. 4. *a,* Hyphae of *P. ferruginosa; b,* Spores.

do not contain spores, and other characters must be used in distinguishing between this species and its allies. However, the difference between the setae in ordinary cases is striking, especially if they be compared side by side under the microscope. Occasionally the hymenium of *P. viticola* is somewhat daedaloid—a condition never seen in *P. ferruginosa.*

Poria marginella Peck is a similar species on coniferous wood, but its spore characters are those of *P. viticola.*

The decay caused by this fungus is of the general delignifying type, producing a uniform whitening and softening of the sapwood. No striking characteristics are shown by it. The fungus is apparently not an organism inducing rapid decay, and as it is almost entirely confined to the smaller branches is not of great economic importance in producing timber loss.

PORIA NIGRESCENS Bres., Atti Accad. Rovereto III 3: 83. 1897

Original Description: Late effusa—subiculo membranaceo, stramineo, facile separabili, 1–1.5 mm. crasso; tubulis concoloribus, usque ad 2 mm. longis; poris parvis, subrotundis, in vegeto albis, dein pallide carneo-violaceis, demum nigrescentibus; hyphis subhymenialibus tenuiter tunicatis, 4–6 μ latis; sporis non visis.

Perennans, stratosus, tubulis singolorum annorum strato intermedio floccoso distinctis.

Ad truncos emortuos *Abietis pectinatae.* Hung.

Redescription: Perennial, or at least often persisting for as much as three or four years, effused in orbicular or elongated patches 3–9 cm. long, 2–5 cm. broad, and up to 1.5 cm. thick, separable at least in age, with a narrow adnate or loosening border on which partially formed pores are visible under a lens; subiculum distinct but scarcely 0.5 mm. thick, white when fresh, more yellowish on drying; tubes in old plants in distinct layers separated by thin layers of context and in drying sometimes partially loosening from each other, typically with the growth of each season not covering all the hymenial area produced in the preceding season, 1.5–5 mm. long each season, close to light vinaceous fawn (flesh color) when fresh, some specimens drying out to cinnamon drab or avellaneous, others to fuscous or dusky drab, subcircular to angular, rather thick-walled, averaging 5–6 per mm., the dissepiments entire; spores broadly ellipsoidal to nearly globose, smooth, hyaline, 3–5 μ diameter; cystidia none; hyphae hyaline, mostly very thick-walled, simple, with cross walls but no clamps, diameter 4.5–7.5 μ.

On rotten logs of deciduous wood, especially beech and birch.

Specimens Examined: North Conway, N. H.; Ithaca, Jamesville, and Catskill Mts., N. Y.; Oxford and West Elkton, Ohio; Frankfort, Mich.

The characteristic features of the species appear to be the flesh-colored tint of the hymenium of fresh plants, this fading and darkening on drying; the peculiar perennial habit with the receding growth and well-marked layers of successive years; and the very compact trama with thick-walled hyphae as much as 7.5 μ diameter (Fig. 6, *a*).

No specimens are at hand in which more than four layers of tubes are present, and the plant is evidently not indefinitely perennial. Each layer of tubes is laid down on a thin, distinct layer of context, and in dried specimens these layers have separated to such an extent that they may be readily removed, one from the other. Moreover, the peculiar habit of the receding marginal growth suggests that at the beginning of successive years the hyphae that have persisted are in localized areas from which the current season's growth proceeds, forming at first, on the surface of the old hymenium, small orbicular patches which gradually enlarge but never or rarely cover the entire area of the old hymenium.

In cross sections of the hymenium the trama is seen to be very compact, the sections of the closely crowded, thick-walled hyphae giving a pseudo-cellular appearance (Pl. I, fig. 2), such as is always found in similar sections of the hymenium of *Fomes connatus,* a common perennial sessile form on species of *Acer.* Moreover, Bresadola, the author of this species, states that it has often been confused with the resupinate form of *F. connatus* (=*F.*

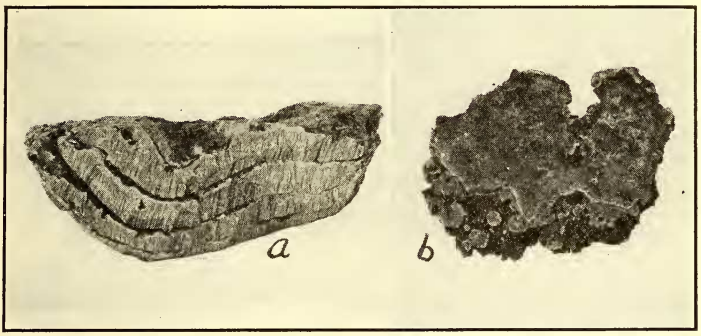


FIG. 5. *P. nigrescens. a,* Lateral view of vertical section through sporophore, showing the evident, separating annual layers; *b,* Surface view showing the failure of growth of current season to cover the entire growth of the previous year. × 1.

populinus). This pseudo-parenchymatous appearance is also present in the hymenium of *Polyporus rigidus* Lév. as interpreted by the writer, which species is also often entirely resupinate, has a flesh-colored hymenium when fresh, the spores being similar. However, that species does not become noticeably darker on drying, nor is it ever perennial. In the present species the hymenium in some collections is now quite blackish or smoke-colored.

The identity of American collections rests in part on the opinion of Rev. Bresadola, its author, who so referred specimens of one of the collections cited above. In addition he has very kindly communicated to the writer a small portion of co-type material which has been carefully examined and with which the writer's specimens agree quite fully. The original description says " sporis non visis," and, curiously enough, they are rarely found in dried American specimens, but have been found abundantly in fresh material. In the co-type material they are absent from the appar-

ently well-developed and matured part of the hymenium, as are also the basidia, but on examining the forming tubes on the marginal growth a number of spore-like bodies, the counterparts of the spores found in fresh American collections, were encountered. They were not attached to basidia, but in all probability represent

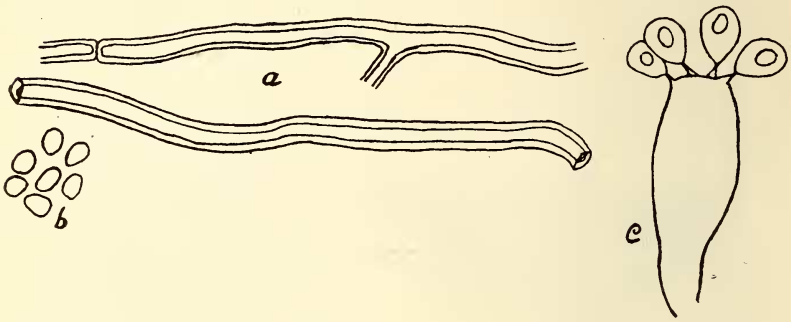


FIG. 6. *a*, Thick-walled hyphae characteristic of *P. nigrescens; b*, Spores; *c*, Basidium with 4 spores.

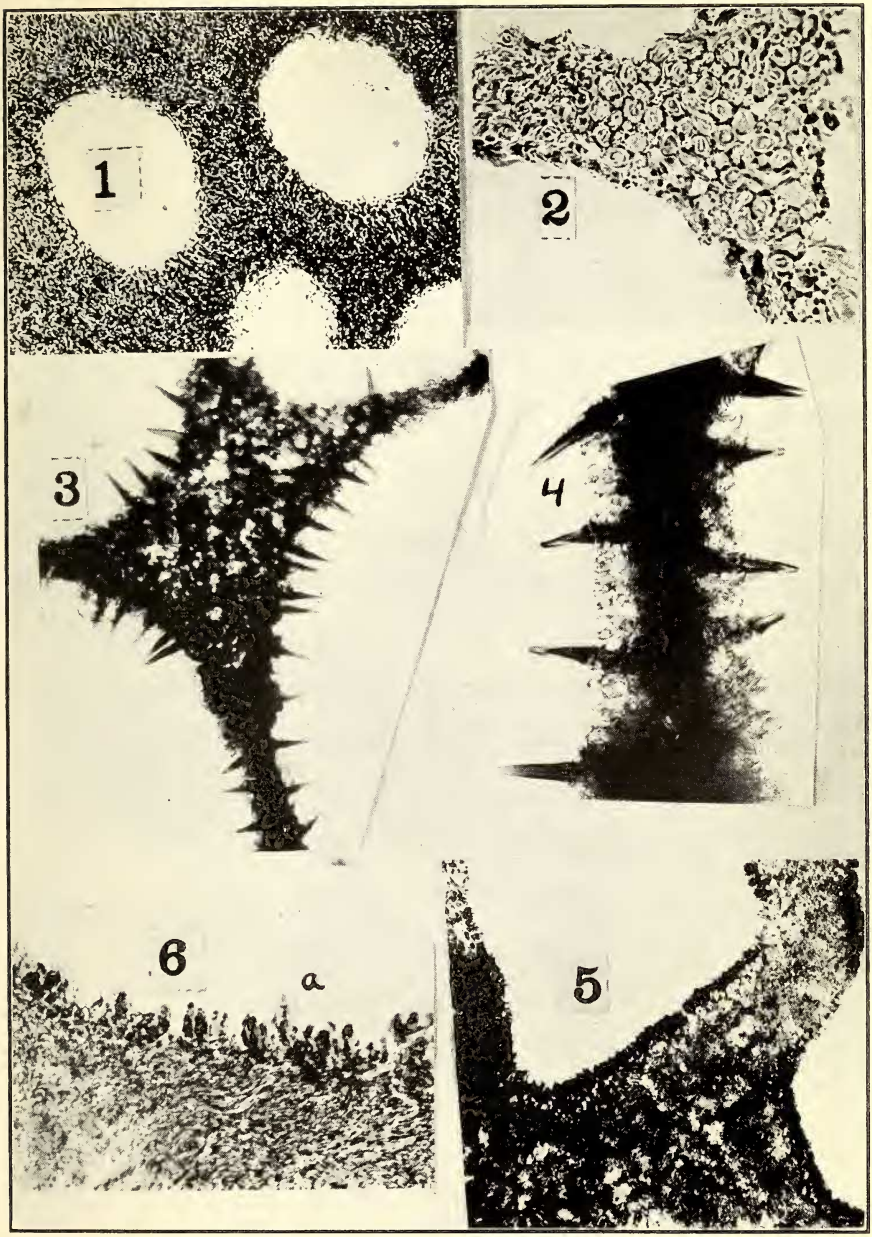
the spores of the specimen. In practically all cases basidia and spores are uniformly absent from the tubes of well-developed specimens (Pl. I, figs. 1–2).

Bresadola's specimens were said to have grown on the wood of *Abies pectinata,* a coniferous substratum, while all American collections so far examined have been from the wood of deciduous trees.

Dr. Murrill[1] considers this plant not specifically distinct from *P. undata* (Pers.) Bres., and gives, among others, *P. odora* Peck and *Polyporus broomei* Rab. as synonyms. *P. odora* was recently described[2] by myself as having allantoid spores which would remove the possibility of its being connected with the present species. Since the publication of Dr. Murrill's opinion I have reexamined specimens from Peck's types and have thoroughly convinced myself that my former statement was correct. I have found abundant allantoid spores attached to 4-sterigmate basidia. As previously stated, the older parts of the hymenium in this collection are not in sporulating condition, but toward the margin of

[1] Mycologia 13: 87. 1921.

[2] Bul. N. Y. State Mus. 205–206: 97–99. 1919.



1, 2. PORIA NIGRESCENS
3, 4. PORIA FERRUGINOSA
5, 6. PORIA AMBIGUA